



DOCKET NO: 264738US0PCT

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF

:

RAINER BLUM, ET AL.

: EXAMINER: CORDRAY, D. R.

SERIAL NO: 10/523,417

:

FILED: FEBRUARY 3, 2005

: GROUP ART UNIT: 1731

FOR: PRODUCTION OF PAPER, BOARD :  
AND CARDBOARD

APPEAL BRIEF

COMMISSIONER FOR PATENTS  
ALEXANDRIA, VIRGINIA 22313

SIR:

This is an appeal of the Final Rejection dated June 9, 2006 of Claims 1-10. A Notice of Appeal is **submitted herewith**.

I. REAL PARTY IN INTEREST

The real party in interest in this appeal is BASF Aktiengesellschaft having an address at 67056 Ludwigshafen, Germany.

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## II. RELATED APPEALS AND INTERFERENCES

Appellants, Appellants' legal representative and the assignee are aware of no appeals, interferences, or judicial proceedings which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

## III. STATUS OF THE CLAIMS

Claims 1-10, all the claims in the application, stand rejected and are herein appealed.

## IV. STATUS OF THE AMENDMENTS

No amendment under 37 CFR 1.116 has been filed. However, a Declaration under 37 CFR 1.132 was filed on September 29, 2006. In a first Advisory Action entered October 16, 2006, the Examiner indicated that the Declaration would not be entered. In a subsequent Advisory Action entered October 30, 2006, the Examiner indicated that the Declaration would be entered.

## V. SUMMARY OF THE CLAIMED SUBJECT MATTER

Independent Claim 1 is drawn to a process for the production of paper, board or cardboard, said process comprising:

shearing a paper stock,

adding a microparticle system comprising a cationic polymer and a finely divided inorganic component to the paper stock in a retention aid effective amount (1) after the last shearing stage before a head box,

draining the paper stock and forming a sheet, and

drying said sheet,

wherein said cationic polymer is selected from the group consisting of cationic polyacrylamide, a polymer comprising one or more vinylamine units, polydiallyldimethylammonium chloride and mixtures thereof, wherein said cationic polymer has an average molar mass  $M_w$  of at least 500 000 Dalton and a charge density of not more than 4.0 meq/g and

the microparticle system is free of one or more polymers having a charge density of more than 4 meq/g.

See original Claim 1, and the specification at page 3, lines 12-25.

## VI. GROUNDS OF REJECTION

### Ground (A)

Claims 1 and 3-8 stand rejected under 35 U.S.C. § 102(b) as anticipated by U.S. 5,529,699 (Kuo et al), in view of US 4,964,955 (Lamar et al) and US 5,690,789 (Small et al).<sup>1</sup>

### Ground (B)

Claims 2 and 9 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Kuo et al in view of Lamar et al and Small et al.

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<sup>1</sup> That the new prior art, i.e., Lamar et al and Small et al, is not listed in the statement of the rejection is irrelevant; reliance thereon is all that is necessary. "Where a reference is relied on to support a rejection, whether or not in a 'minor capacity,' there would appear to be no excuse for not positively including the reference in the statement of rejection." *In re Hoch*, 166 USPQ 406, 407 n.3 (CCPA 1970). See also MPEP 706.02(j).

Ground (C)

Claims 1-10 stand rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. 6,379,501 (Zhang et al) in view of Kuo et al in view of Lamar et al and Small et al.

VII. ARGUMENT

Ground (A)

Claims 1 and 3-8 stand rejected under 35 U.S.C. § 102(b) as anticipated by Kuo et al. That rejection is untenable and should not be sustained.

The present invention is based on a discovery that when a particular cationic polymer having a particular molecular weight and a particular charge density is used in a microparticle system functioning as a retention aid in papermaking, and the microparticle system is free of polymers having a charge density of more than 4 meq/g, less microparticle system is necessary for a given amount of retention if the microparticle system is added after the last shearing stage before a head box. The applied prior art does not recognize this discovery.

Kuo et al discloses particular, asserted to be novel, water soluble cationic copolymers, i.e., formed from reaction products of an N-vinylamide with either an ester having a quaternary ammonium moiety or a quaternary alkyl pyridinium group or mixtures thereof (column 4, line 63ff), for various functions, such as part of retention and drainage aids for use in papermaking systems, which cationic copolymers have molecular weights from 3,000 to 4 million, but due to solubility and handling considerations, preferably within a range of from 10,000 to 2 million (column 8, lines 24-30), and a charge density in the range of 1 to 24 meq/g, preferably 4 to 22 meq/g, most preferably 10 to 20 meq/g as determined at pH 4 (column 11, lines 14-18), which copolymers may be used with, *inter alia*, microparticles such

as bentonite (paragraph bridging columns 9 and 10), and which copolymers and microparticles may be added to an aqueous pulp suspension “in any order and at any point in the papermaking process prior to the head box, either before or after one of the several shear stages, with best results achieved when the copolymer is added to thin stock rather than to thick stock, and the microparticle solution is preferably added after the copolymer solution. Typically, both components are added close to the head box prior to sheet formation (column 10, lines 43-53).

The Examiner finds that the above features “overlap and thus anticipate” the presently-claimed invention.

Applicants have argued that Kuo et al does not anticipate the presently-claimed invention because it fails to satisfy the test set forth in *In re Arkley*, 455 F.2d 586, 172 USPQ 524 (CCPA 1972). The Examiner responded by citing *In re Burckel*, 592 F.2d 1175, 201 USPQ 67 (CCPA 1979) for the proposition that a reference is not limited to its preferred embodiments, but must be evaluated for all of its teachings, including its teachings of non-preferred embodiments, and then finds that Kuo et al discloses ranges of molecular weight and charge density that “significantly overlap the claimed ranges; no picking and choosing from additional references was needed or used.”

The *Arkley* test is set forth below (455 F.2d 586, 590, 172 USPQ 524, 526 (CCPA 1972):

[R]ejections under 35 U.S.C. 102 are proper only when the claimed subject matter is identically disclosed or described in “the prior art.” Thus, for the instant rejection under 35 U.S.C. [102(b)] to have been proper, the . . . reference must clearly and unequivocally disclose the claimed [subject matter] or direct those skilled in the art to the [subject matter] without any need for picking, choosing, and combining various disclosures not directly related to each other by the teachings of the cited reference. Such picking and choosing may be entirely proper in the making of a 103, obviousness rejection, where the applicant must be afforded an opportunity to rebut

with objective evidence any inference of obviousness which may arise from the similarity of the subject matter which he claims to the prior art, but it has no place in the making of a 102, anticipation rejection.

Kuo et al does not satisfy the *Arkley* test, on many levels. The kind of picking and choosing discussed in *Arkley* would, at a minimum, be required herein. More significantly, the present claims require that **no** polymer having a charge density more than 4 meq/g be present. Yet Kuo et al, on the other hand, most prefer that their polymer have a charge density of from 10 to 20 meq/g. Nor does Kuo et al's disclosure of the end point "1" meq/g constitute an anticipation because it is not more than 4 meq/g.

Nor do Applicants challenge the legal proposition for which *Burckel* has been cited, but *Burckel* is inapposite. The question is whether Kuo et al is anticipatory, not whether it is available for non-preferred embodiments. Nor does the absence of reliance on additional prior art mean that the picking and choosing which is proscribed by *Arkley*, was not needed or used. (Additional prior art was necessary--the Examiner additionally relies on Lamar et al and Smith et al.) The Examiner necessarily had to pick and choose from the broad disclosure of Kuo et al.

Indeed, the Examiner relies on Lamar et al and Small et al to find that the above-excerpted passage from Kuo et al, i.e., "close to the head box prior to sheet formation" would be after the last shearing stage.

Applicants have argued that the above-quoted excerpt is not necessarily synonymous with "after the last shearing stage" In support, and as the Isermann Declaration of record declares, while the above-quoted excerpt from Kuo et al "**could** be after the last shearing stage, the terms 'after the last shearing stage' and 'close to the head box prior to sheet formation' are not synonymous in the art. In other words, 'close to the head box prior to

sheet formation' could mean close in terms of time, and would not necessarily be presumed to require that it be after the last shearing stage. **Close** to the head box is not the same as **closest** to the head box." (All emphasis by Isermann.)

Isermann further describes, graphically, in the color drawings attached to his Declaration, a simplified flowchart of a typical papermaking process, and the same flowchart overlaid with the various papermaking stages showing Kuo et al's preferred entry points, i.e., added to thin stock, and preferred order of addition, i.e., copolymer followed by microparticle. One overlaid flowchart shows copolymer followed by microparticle both added at the same stage; the other overlaid flowchart shows copolymer and microparticle added at different stages. Isermann further declares that "for Kuo et al's purposes, no difference in results would be expected, so long as the copolymer and microparticle are added at any of the alternative points shown" in the corresponding flowcharts.

As Isermann shows, even within the preferred possibilities regarding entry points and order of addition, picking and choosing had to occur to meet that feature of the present claims. In addition, the recited maximum of 4 meq/g for the charge density of the cationic polymer of the present claims is significantly below the preferable range of 10 to 20 meq/g of Kuo et al.

Thus, in order to arrive at the present invention from Kuo et al, one skilled in the art would need to select a particular entry point, select a non-preferred charge density of cationic polymer, limit applicable cationic polymers to one having an average molar mass of at least 500,000 Dalton, and exclude such cationic copolymers having a charge density of more than 4 meq/g.

Moreover, even the disclosure in Kuo et al of charge density in the range of 1 to 24 meq/g, preferably 4 to 22 meq/g, most preferably 10 to 20 meq/g as determined at pH 4 (column 11, lines 14-18) is not “sufficient specificity” to anticipate the recital herein of “not more than 4 meq/g” if this were the **only** limitation to be considered on the anticipation issue. See MPEP § 2131.03. As discussed above, it is not the only limitation.

Applicants wish to emphasize that the invention of Kuo et al is the above-discussed water-soluble cationic copolymer *per se*. While described as having use as part of a retention and drainage aid for use in papermaking systems, one skilled in the art would appreciate from Kuo et al that no investigation was made by them of any criticality regarding at what specific stage in the papermaking process it is added.

### Claim 3

Claim 3 is separately patentable, because Kuo et al does not disclose a cationic polymer comprising one or more vinylamine units obtained by hydrolysis of a polymer comprising one or more vinylformamide units, the degree of hydrolysis of the vinylformamide units being from 20 to 100 mol%. The inventive polymer of Kuo et al would appear to contain **no** vinylamine units.

For all the above reasons, it is respectfully requested that this rejection be REVERSED.



Ground (B)

Claims 2 and 9 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Kuo et al. That rejection is untenable and should not be sustained.

Applicants submit that at best, Kuo et al. is available for rejected Claims 1-9 under 35 U.S.C. § 103(a) only, but since Claims 1 and 3-8 were rejected only under 35 U.S.C. § 102(b), the issue of 35 U.S.C. § 103(a) is discussed herein.

There is no motivation to eliminate all polymers with a charge density more than 4 meq/g in Kuo et al. when Kuo et al.'s preferred copolymers have such a charge density. Indeed, one of ordinary skill in the art reading Kuo et al. would not appreciate or predict the significance of the results obtained in the saving of retention aid materials when the presently-claimed invention is carried out. Such saving is demonstrated by the comparative data of record. By comparing Example 1 with Comparative Example 1, described in the specification at page 7, line 9ff, it is seen that by adding the cationic polyacrylamide after the last shearing stage, rather than earlier, saving of polymer was 30% and saving of bentonite was 10% for substantially the same first pass retention (FP) and a particular first pass ash retention (FPA), while the improvement in drainage over a wire was about 10%. Similar results were obtained, as can be ascertained by comparing Example 2 with Comparative Example 2, described in the specification beginning at page 7, line 41.

In addition, Claim 2 requires that the cationic polymer have an average molar mass of at least 5 million Dalton, which would appear to be outside the range disclosed by Kuo et al., and be a polyacrylamide, which is different from the inventive water-soluble cationic copolymer of Kuo et al.

The Examiner finds that “[w]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation,” citing *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

In reply, the present claims are patentable under the rationale of *In re Antonie*, 195 USPQ 6, 8-9 (CCPA 1977) (exceptions to rule that optimization of a result-effective variable is obvious, such as where the results of optimizing the variable are unexpectedly good or where the variable was not recognized to be result effective). Applicants are entitled to prevail under either of the above exceptions.

For all the above reasons, it is respectfully requested that this rejection be REVERSED.

Ground (C)

Claims 1-10 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Zhang et al in view of Kuo et al. That rejection is untenable and should not be sustained.

Zhang et al is drawn to a process of papermaking, which involves substantially simultaneously or sequentially adding to a cellulose slurry at least one aluminum compound and at least one water-soluble silicate (column 2, lines 56-59). Zhang et al discloses further the addition of additives to the slurry, such as flocculants and other retention aid materials (column 13, lines 1-8); such a flocculant is a cationic polymer having a potential charge density of preferably 0.1 to 4 meq/g (column 13, lines 63-65). The Examiner finds that the above-discussed silicate meets the terms of the presently-recited finely divided inorganic component. In addition, while the Examiner finds that Zhang et al does not disclose that the cationic polymer and (and other additives) are added after the last shear stage and before the

head box, Zhang et al discloses that their additive, which includes the cationic polymer flocculant, is preferably added to the paper stock **before** the last shearing stage, while the aluminum and silicate compounds are added after the last shearing stage, but prior to the head box (column 13, lines 13-26). Thus, Zhang et al explicitly discloses that their flocculant, such as their cationic polymer, is added preferably before the last shearing stage.

The disclosures and deficiencies of Kuo et al have been discussed above. Kuo et al does not remedy Zhang et al because Kuo et al would not cause one skilled in the art to alter the time of addition of the flocculant and other retention aid additives of Zhang et al, even though the above-discussed time of addition in Zhang et al discussed above is only preferred, and presumably not mandatory.

More important, the applied prior art could not have predicted the results obtained by Applicants, as discussed above, when adding their microparticle system after the last shearing stage before a head box.

Indeed, the Examiner has never challenged the superior results obtained by Applicants. Rather, the Examiner simply finds that if not anticipated, doing what Applicants have done would have been obvious. However, the Examiner must consider **all** the evidence in the record. Since the actual data disclosed in the specification and discussed by Applicants have not even been discussed in the Office Action, it is clear that the Examiner has not considered the invention **as a whole**, as required by 35 U.S.C. § 103(a).

The Examiner cites *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977) for the proposition that when claimed and prior art apparatus or product are identical or substantially identical in structure or composition, a *prima facie* case of anticipation or obviousness has been established, and that “when the structure in the reference is

substantially identical to that of the claims, the claimed properties or functions are presumed to be inherent.”

In reply, *Best* is inapposite since neither Zhang et al nor Kuo et al are identical or substantially identical in structure or composition vis-vis the presently-claimed process, as discussed above.

Claim 10

Claim 10 is separately patentable, because it is specifically tailored to the above-discussed superior results.

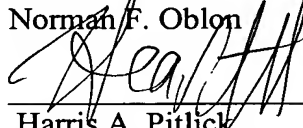
For all the above reasons, it is respectfully requested that this rejection be REVERSED.

VIII. CONCLUSION

For the above reasons, it is respectfully requested that all the rejections still pending be REVERSED.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,  
MAIER & NEUSTADT, P.C.  
Norman F. Oblon

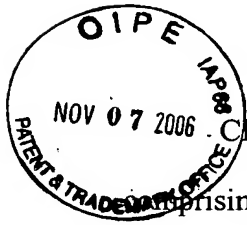


Harris A. Pitlick

Registration No. 38,779

Customer Number  
**22850**

Tel: (703) 413-3000  
Fax: (703) 413 -2220  
(OSMMN 06/04)  
HAP/rle



CLAIMS APPENDIX

Claim 1: A process for the production of paper, board or cardboard, said process comprising:

- shearing a paper stock,
- adding a microparticle system comprising a cationic polymer and a finely divided inorganic component to the paper stock in a retention aid effective amount (1) after the last shearing stage before a head box,
- draining the paper stock and forming a sheet, and
- drying said sheet,

wherein said cationic polymer is selected from the group consisting of cationic polyacrylamide, a polymer comprising one or more vinylamine units, polydiallyldimethylammonium chloride and mixtures thereof, wherein said cationic polymer has an average molar mass  $M_w$  of at least 500 000 Dalton and a charge density of not more than 4.0 meq/g and

the microparticle system is free of one or more polymers having a charge density of more than 4 meq/g.

Claim 2: A process as claimed in claim 1, wherein said cationic polymer is said cationic polyacrylamide having an average molar mass  $M_w$  of at least 5 million Dalton and a charge density of from 0.1 to 3.5 meq/g.

Claim 3: A process as claimed in claim 1, wherein said cationic polymer is said polymer comprising one or more vinylamine units obtained by hydrolysis of a polymer comprising one or more vinylformamide units, the degree of hydrolysis of the

vinylformamide units being from 20 to 100 mol% and the average molar mass of the polyvinylamines being at least 2 million Dalton.

Claim 4: A process as claimed in claim 1, wherein the cationic polymer of the microparticle system is added to the paper stock in an amount of from 0.005 to 0.5% by weight, based on dry paper stock.

Claim 5: A process as claimed in claim 1, wherein the cationic polymer of the microparticle system is added to the paper stock in an amount of from 0.01 to 0.2% by weight, based on dry paper stock.

Claim 6: A process as claimed in claim 1, wherein said inorganic component is at least one material selected from the group consisting of bentonite, colloidal silica, silicate, calcium carbonate, and mixtures thereof.

Claim 7: A process as claimed in claim 1, wherein the inorganic component of the microparticle system is added to the paper stock in an amount of from 0.01 to 1.0% by weight, based on dry paper stock.

Claim 8: A process as claimed in claim 1, wherein the inorganic component of the microparticle system is added to the paper stock in an amount of from 0.1 to 0.5% by weight, based on dry paper stock.

Claim 9: A process as claimed in claim 1, wherein the cationic polymer is metered into the paper stock and then the inorganic component of the microparticle system is metered into the paper stock.

Claim 10: A process as claimed in claim 1, wherein said retention aid effective amount (1) provides a particular first pass retention (FP) and a particular first pass ash retention (FPA), and wherein said amount (1) provides the same or substantially the same FP and FPA when the microparticle system is added in an amount (2), except that the cationic polymer portion of the microparticle system in amount (2) is added before said last shearing stage, wherein amount (1) is less than amount (2).

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EVIDENCE APPENDIX

Declaration under 37 CFR 1.132 of Ralph Isermann, filed September 29, 2006.





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DECLARATION UNDER 37 CFR 1.132

COMMISSIONER FOR PATENTS  
ALEXANDRIA, VIRGINIA 22313

SIR:

I, Ralph Isermann, Dipl.-Ing. (TH), a citizen of the Federal Republic of Germany and residing at 24, Neckarpromenade, 68167 Mannheim, Federal Republic of Germany, declare as follows:

1. I am a fully trained paper engineer, having studied engineering at the University of Kaiserslautern (intermediate diploma), from 1987 to 1989, and paper engineering at the Technical University of Darmstadt (diploma), from 1989 to 1994. During my graduate studies I spent one term at the EFPG Grenoble, France (EFPG: Ecole Française de Papeterie et des Industries Graphiques), I worked on my diploma thesis at the CTP Grenoble, France (CTP: Centre Technique du Papier), and graduated at the Technical University of Darmstadt in 1994;

I am well acquainted with technical English;

I joined BASF Aktiengesellschaft of 67056 Ludwigshafen, Federal Republic of Germany, in 1995, start working in applications engineering for paper in Ludwigshafen until

1997. From 1997 to 2002 I have been working for sales and marketing for paper chemicals and their application on paper machines. Since 2003 I have been working again in applications engineering for paper in Ludwigshafen.

2. I am familiar with the claims, and have read the Office Action mailed June 9, 2006, in the above-identified application.

3. The Examiner holds that the claims in the above-identified application are unpatentable over US Patent No. 5,529,699 (Kuo et al). The Examiner additionally relies on US Patent No. 4,964,955 (Lamar et al) and US Patent No. 5,690,789 (Small et al) to find that "close to the head box prior to sheet formation," as disclosed in Kuo et al, would be after the last shearing stage.

4. Kuo et al discloses water soluble cationic copolymers for various functions, such as part of retention and drainage aids for use in papermaking systems, which cationic copolymers have a charge density in the range of 1 to 24 meq/g, preferably 4 to 22 meq/g, most preferably 10 to 20 meq/g as determined at pH 4, which copolymers may be used with microparticles, and which copolymers and microparticles may be added to an aqueous pulp suspension "in any order and at any point in the papermaking process prior to the head box, either before or after one of the several shear stages, . . . [with b]est results achieved when the copolymer is added to thin stock rather than to thick stock, and the microparticle solution is preferably added after the copolymer solution. Typically, both components are added close to the head box prior to sheet formation." See column 10, lines 45-53.

5. Attached herewith, in color, are three drawings. One shows a typical papermaking process simplified flow chart. The other two drawings are of the same flow chart but overlaid with the various papermaking stages in which Kuo et al's preferred entry points, i.e., added to thin stock, and preferred order of addition, i.e., copolymer followed by microparticle. In one of these drawings, labeled Kuo et al. (1), the copolymer and

microparticle are added at the same stage. In the other of these drawings, labeled Kuo et al. (2), the copolymer and microparticle are added at different stages. Thus, for Kuo et al.'s purposes, no difference in results would be expected, so long as the copolymer and microparticle are added at any of the alternative points shown in flow charts (1) or (2).

6. Lamar et al discloses the term "after the last point of high shear prior to sheet formation, typically at or close to the head box" (column 13, lines 16-17). Small et al discloses the term "at a point close to the head box of the papermaking machine, in order that the agglomerated or comminuted material is not re-dispersed or otherwise adversely affected by conditions of heavy shear" (column 2, lines 43-46). While these disclosure in Lamar et al and Small et al do provide support for a finding that "close to the head box prior to sheet formation" could be after the last shearing stage, the terms "after the last shearing stage" and "close to the head box prior to sheet formation" are not synonymous in the art. In other words, "close to the head box prior to sheet formation" could mean close in terms of time, and would not necessarily be presumed to require that it be after the last shearing stage. Close to the headbox is not the same as closest to the headbox.


7. Nor does Kuo et al alone, or combined with US Patent No. 6,379,501 (Zhang et al), suggest that when a particular cationic polymer having a particular molecular weight and a particular charge density is used in a microparticle system functioning as a retention aid in papermaking, and the microparticle system is free of polymers having a charge density of more than 4 meq/g, as required by the pending claims in the above-identified application, less microparticle system is necessary for a given amount of retention if the microparticle system is added after the last shearing stage before a head box.

8. The undersigned declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false

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Declaration under 37 CFR 1.132

statements and the like so made are punishable by fine or imprisonment, or both, under  
Section 1001 of Title 18 of the United States Code and that such willful false statements may  
jeopardize the validity of this application or any patent issuing thereon.

9. Further declarant saith not.

  
\_\_\_\_\_  
Signature

26.09.06  
\_\_\_\_\_  
Date

Application No. 10/523,417  
Appeal Brief

RELATED PROCEEDINGS APPENDIX

None.